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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/694,216	10/28/2003	Michael Patrick Harmon	08350.3198	3004

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CATERPILLAR/FINNEGAN, HENDERSON, L.L.P.
901 New York Avenue, NW
WASHINGTON, DC 20001-4413

EXAMINER

RIDDLE, KYLE M


ART UNIT	PAPER NUMBER
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3748

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/21/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s) 	
	10/694,216	HARMON, MICHAEL PATRICK	
	Examiner	Art Unit	
	Kyle M. Riddle	3748	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 March 2007.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 and 13-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 13-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 3-5, 7, 8, 13-16, 18-20, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Luria (U.S. Patent 4,084,557) in view of Aso (JP Publication 55-035115).

Re claims 1, 4, 5, 13, 16, 19, and 20, Luria discloses a valve actuation mechanism comprising:

- a block or cylinder head 2 with main cylinder 3 and piston 4 defining a combustion chamber (column 3, lines 41-43; Figure 1);
- a crankshaft (Figure 1);
- an engine valve or intake valve 8 moveable between a first position at which the valve prevents the flow of fluid relative to the combustion chamber or closed position and a second position at which the fluid flows relative to the combustion chamber or open position (column 3, lines 44-46, lines 66-68 with column 4, lines 1-6, lines 13-16; Figures 4a-5c);
- a cam follower or rocker arm 20 having a fixed central pivot 80 operatively connected to the intake valve 8 (column 3, lines 45-50, column 5, lines 14-16; Figures 1, 4a-5c);

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- a first cam 12 engaging rocker arm 20 at a first end through pushrod 18 to rotate rocker arm 20 in a first direction about the pivot 80 to open intake valve 8 during a first lift period (column 3, lines 45-50; Figures 1, 4a-5c);

- a second cam 34 engaging rocker arm 20 at a second end to rotate rocker arm 20 in a second direction about the pivot opposite the first direction to open intake valve 8 during a second lift period (column 6, lines 15-34; Figures 1, 4a-5c);

- a phase shifting means including worm 60 and gears 52, 54, 56 to adjust the timing of the second cam 34 relative to the first cam 12 between the first lift period and the second lift period (column 4, lines 32-50; Figures 1, 2, 4a-5c);

- the second cam 34 selectively engaging and disengaging the rocker arm 20 (column 5, lines 47-68 with column 6, lines 1-34; Figures 1, 4a-5c).

Re claims 3 and 18, Luria discloses the second lift period overlapping with at least a portion of the first lift period (column 6, lines 8-34; Figures 5a-5c).

Re claims 7, 8, 14, 15, and 22, Luria discloses a first impact absorbing device or follower 16 between first cam 12 and rocker arm 20 (column 3, lines 46-50, column 5, lines 15-18; Figures 1, 4a-5c) and a second impact absorbing device or interposer 90 between second cam 34' and rocker arm 20' (column 6, lines 49-63; Figure 6).

Luria, however, fails to specifically disclose the first and second cams directly contacting the cam follower.

Also teach a variable valve timing device having two cams 10, 11 directly contacting the rocker arm 19, the cams able to vary the relative angle by a differential gear and a centrifugal governor (Patent Abstract, page 1; Figure 5). It would have been obvious to one having ordinary

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skill in the art at the time of the invention was made, to have utilized the teaching by Aso in the valve actuation mechanism of Luria, since the use thereof would negate the need for the additional pushrod, simplify construction, and reduce the overall size of the valve actuating mechanism.

3. Claims 2 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Luria in view of Aso, as applied to claims 1 and 16 respectively, above, and further in view of Hara et al. (U.S. Patent 4,708,101).

Luria, as modified by Aso, discloses the valve actuation mechanism cited above, however, fails to specifically disclose the phase shifting mechanism including a helical spline and a hydraulic actuator.

Hara et al. teach an engine valve 12 operatively moveable between an open and closed position, a cam follower 15 operatively connected to the engine valve 12, a first cam 13 adapted to engage the cam follower 15 to actuate the engine valve 12 during first lift period (column 6, lines 24-68 with column 7, lines 1-39; Figures 8A, 12, and 13), a second cam 17 adapted to engage the cam follower to actuate the movement of the engine valve 12 during a second lift period (column 6, lines 24-68 with column 7, lines 1-39; Figures 8A, 12, and 13), a phase shifting device 23 operatively connected to the first cam 13 and adapted to adjust the relative timing between the first lift period and the second lift period (column 4, lines 65-68 with column 5, lines 1-16; Figure 8B), the phase control mechanism 23 including a helical spline and a hydraulic actuator (column 4, lines 65-68 with column 5, lines 1-31; Figures 9 and 10). It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the teaching by Hara et al. in the valve actuating mechanism of Luria, as

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modified by Aso, since the use thereof would replace the worm gear phase adjusting mechanism with a more versatile, hydraulically controlled mechanism to enable more accurate phase changing with wider variations in timing and lift control.

4. Claims 6 and 21 are rejected under 35 U.S.C. 103(a) as being obvious over Luria in view of Aso.

Luria, as modified by Aso, discloses the valve actuating mechanism cited above, however, fails to specifically disclose an additional rocker arm or cam follower with a pushrod. Luria discloses the use of a pushrod 18, and the addition of a rocker and another pushrod connected to the disclosed rocker arm 20 would be obvious and well within one of ordinary skill depending on space and location considerations, rotational forces, and the overall size of the engine. Moreover, there is nothing in the record which establishes that the application of such an addition rocker arm and pushrod represents a novel or unexpected result (See *In re Kuhle*, 526 F.2d 553, 188 USPQ 7 (CCPA 1975)).

Response to Arguments

5. Applicant's arguments with respect to claims 1, 13, and 16 have been considered but are moot in view of the new ground(s) of rejection.

6. Applicant has amended the independent claims to specify the two cams making direct contact with the cam follower. As cited above, the examiner has provided a prior art reference meeting this limitation.

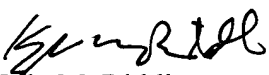
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Communication


7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kyle M. Riddle whose telephone number is (571) 272-4864. The examiner can normally be reached on M-F (07:30-5:00) Second Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Denion can be reached on (571) 272-4859. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


Kyle M. Riddle
Examiner
Art Unit 3748

kmr


THOMAS DENION
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